Stormwater Infrastructure Improvement Plan Overview
Newton, MA

Like many communities, the City of Newton's stormwater system is old and faces challenges related to stormwater quality and quantity; system maintenance and capital upgrades; localized flooding; and NPDES Phase 2 MS4 General Permit (Federal Stormwater Permit) compliance. Even though the City completes regular maintenance tasks such as grate clearing and catch basin cleaning, as well as a variety of stormwater projects, including water quality sampling, relatively little is known about the condition of the City's 320 miles of drainage infrastructure. A comprehensive plan was required to understand the full range of current and future stormwater needs.

The development of a multi-year Stormwater Infrastructure Improvement Plan will allow the City to efficiently invest in infrastructure improvements to meet the City's stormwater goals over the next 20 years. These include federal permit compliance; protection and improvement of local water quality; and investing in infrastructure improvements to reduce flooding and ensure an adequate level of service. Given these goals, the Stormwater Infrastructure Improvement Plan focuses on four types of projects: federal permit compliance, localized flooding, stream improvements and culverts.

Federal Stormwater Permit Compliance

The City's current stormwater discharges are covered under EPA's 2003 NPDES Phase 2 Small MS4 General Permit. Although this permit technically expired in 2008, the City is covered under the permit until a new permit is issued. A Draft MS4 General Permit was released for public comment on September 29, 2014. Once the permit is final, the City will be required to fulfill a number of requirements to be in compliance. The requirements fall under the following minimum control measures:

- Public Education & Outreach
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management
- Good Housekeeping and Pollution Prevention

In addition, there are significant requirements included in the permit related to the Charles River Phosphorus and Charles River Pathogens Total Maximum Daily Loads. There are also separate requirements related to impaired waters without an approved Total Maximum Daily Load, including Saw Mill Brook, which is impaired for chloride.

A summary table was developed outlining the requirements of the draft permit with an estimated compliance cost for the twenty year life of the permit. The City will need to invest an estimated $11.0 million over the next twenty years to comply with the new permit. Complying with the Charles River Phosphorus Total Maximum Daily Load requirements and implementing the Illicit Discharge Detection and Elimination Program will carry the largest financial burden.

Localized Flooding Areas

Public works and engineering staff identified ten areas with reoccurring localized flooding. A site visit was conducted at each location to document existing conditions and identify potential solutions. At some locations the solution will require a phased approach that includes evaluation, design and construction phases. The goal at each location is to eliminate localized flooding while incorporating Best Management Practices for green infrastructure. Planning level costs for evaluation, design and construction are included in the Stormwater Infrastructure Improvement Plan for each flooding location. The total cost of localized flooding projects is estimated at $3.0 million.

Stream Improvements

A condition assessment of the City's streams and brooks was performed to understand the scope of work and cost associated with rehabilitating deficiencies in these assets. Open channel streams and brooks are an integral part of flood protection. A walking stream survey was conducted on more than 14 miles of stream to document stream condition and to develop a list of recommended improvements. Recommended improvements include: removal of debris within the stream channel and embankments, including fallen trees; removal of sediment in the stream bed and at culverts; structural evaluation, rehabilitation and maintenance at selected culverts; and repair of failing retaining walls. The estimated planning level cost to complete the stream improvement work is $12.3 million. The estimate includes an allowance for design, permitting and construction.

Culvert Inspections/Repairs

Since 2000, the City has completed a number of culvert evaluation projects, including the evaluation of 13,000 linear feet of Laundry Brook culvert and a preliminary inspection of various road-width culverts. The stream assessment work completed as part of this project collected additional data regarding the condition of road-width culverts and the headwalls of various pipe culverts. Culverts that were identified for future repair are identified as separate projects within the Stormwater Infrastructure Improvement Plan and have been assigned planning level repair costs. Many culverts will require a complete structural evaluation to fully understand the extent of repairs that will be required.

Most of the City's drainage piping has never been inspected and its condition is unknown. Inspection of all the drain pipes is unlikely to yield a positive return on investment and is not recommended at this time. However, it is important to evaluate the condition of critical drainage infrastructure to identify potential emergencies and schedule future improvements. Approximately 100,000 linear feet of critical drainage infrastructure was identified and was divided into four (4) evaluation projects. Each Culvert Evaluation Project includes a structural evaluation of 6 road-width culverts and cleaning/television inspection of 25,000 linear feet of critical storm drain. The total cost of the culvert evaluation work is estimated at $1.6 million. An allowance is included in the Stormwater Infrastructure Improvement Plan to repair deficiencies that may be identified during the evaluation.

The planning level cost estimate for design, permitting and construction of known culvert deficiencies as well as an allowance for problems that may be identified during the evaluation work is $12.7 million.

Prioritization and Stormwater Infrastructure Improvement Plan Development

Rating criteria and project grouping alternatives were developed for each Stormwater Infrastructure Improvement Plan Project. The rating system was used as a basis to prioritize projects and develop the 22-year Stormwater Infrastructure Improvement Plan. Project prioritization is not always consistent with the rating system. For example, if a stream maintenance project was not highly rated individually, but was critical to the success of a highly rated flooding project, the two (2) projects were grouped and will be completed together. Other adjustments were made to decrease total project cost through economy of scale.

The requirements of the pending Federal Stormwater Permit play a significant role in the scope and prioritization of Projects. Permit work is prescriptive and must be completed in certain years. As such, the Stormwater Infrastructure Improvement Plan was built by scheduling the Federal Permit work first and adding other projects as the budget allowed. Funding has been set at $1 million for the first five (5) years, $1.5 million for the second five (5) years, $2 million for the third five (5) years, $2.5 million for the fourth five (5) years, and $3 million for the last two (2) years. The entire cost of the 22-year Program is estimated at $41 million (in 2015 dollars).

Project prioritization will be re-evaluated in Year #6 of the Plan following collection of the additional condition assessment data.